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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,933

07/16/2003

Kang P. Lee

ASPEN-110 CON

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11/30/2006

ASPEN AEROGELS INC.

IP DEPARTMENT

30 FORBES ROAD

BLDG. B

NORTHBOROUGH, MA 01532

EXAMINER

KUGEL, TIMOTHY J

ART UNIT

PAPER NUMBER

1712

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/620,933

Applicant(s)

LEE ET AL.

Examiner

Timothy J. Kugel

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-7,9-12,14-21,24,28-31,36,42 and 48-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-7,9-12,14-21,24,28-31,36,42 and 48-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) See Continuation Sheet are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                       |                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                                      | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>see attached</u> . | 6) <input type="checkbox"/> Other: _____                                                |

Continuation of Disposition of Claims: Claims subject to restriction and/or election requirement are 1,4-7,9-12,14-21,24,28-31,36,42 and 48-51.

### **DETAILED ACTION**

1. Claims 1, 4-7, 9-12, 14-21, 24, 28-31, 36, 42 and 48-51 are pending as amended on 7 November 2006, claims 2, 3, 8, 13, 22, 23, 25-27, 32-35, 37-41 and 43-47 being cancelled.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Please note, in the previous Office action, claim 13 was inadvertently indicated as objected to as being dependent upon a rejected base claim, but being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims since the prior art does not teach or fairly suggest a method of exchanging a first fluid within a gel with a second fluid, wherein both fluids are supercritical fluids, comprising applying pulses of pressure to the gel and both fluids; however, in claim 13 the first fluid was required to be the solvent used to prepare the gel and the second fluid is a supercritical fluid, which is read-upon by a combination of the teachings of US Patent 4,619,908 (Cheng hereinafter) and US Patent 2,993,005 (Kosmin hereinafter). The examiner apologizes for any inconvenience this may have caused.

4. Please further note that the amendment to claim 42 filed 7 November 2006 does not show the term 'carbon dioxide'—removed from the claim—in strike-through font, nor

Art Unit: 1712

does it show the term 'supercritical fluid'—added to the claim as a replacement for the term 'carbon dioxide'—in underlined font. As a courtesy to applicant and in the interest of compact prosecution, the amendment to claim 42 was considered and construed as such.

#### ***Oath/Declaration***

5. Applicant's new oath/declaration, filed 7 November 2006 has been fully considered and are corrective.

The objection to the oath/declaration has been withdrawn.

#### ***Information Disclosure Statements***

6. The information disclosure statements submitted on 28 August 200 and 7 November 2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statements.

#### ***Specification***

7. The disclosure is objected to because of the following informalities: the amendment to the specification filed 7 November 2006 refers to the instant application as a continuation of US Patent Application 09/693,300; however, it should refer to 09/693,390. Further, the reference should refer to the current status of the parent application—that it has issued as US Patent 6,670,402 on 30 December 2003.

Appropriate correction is required.

***Claim Objections***

8. Applicant's amendment, filed 7 November 2006, with respect to the correction of minor informalities in claims 10 and 42 has been fully considered and are corrective.

The objection to claims 10 and 42 has been withdrawn.

***Claim Rejections - 35 USC § 112***

9. Applicant's amendment, filed 7 November 2006, with respect to the removal of parenthetical limitations in claim 20 and the correction of the antecedent basis in claim 42 has been fully considered and is corrective.

The rejection of claims 20 and 42 under 35 USC 112 2<sup>nd</sup> paragraph has been withdrawn.

***Double Patenting***

10. Claims 1, 4-7, 14, 24, 28 and 29 stand, and new claims 48-51 are, rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 4, 5, 9, 10 and 11 of US Patent No. 6,670,402 (Lee '402 hereinafter).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the patent claims a method of reducing the time required to exchange the solvent used to produce a gel with a supercritical fluid at no more than 10C comprising applying pressure pulses—generated by various means including the elected means of through a piezoelectric device—of two different frequencies with amplitudes of from about 0.1 to about 20 psi and from about 10 to about 1,000 psi

Art Unit: 1712

respectively to the gel, solvent and supercritical fluid during the exchange and a method of rapid depressurization of a supercritical fluid within and around an aerogel comprising exchanging the supercritical fluid with a non-reacting non-condensing gas before or during the depressurization and further comprising applying pulses of two different frequencies. Further, the disclosure defines the form of the aerogel to be to be 'beads', 'monoliths' and 'composites' as defined in the instant specification (Column 4 Lines 11-25). See *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

11. Claims 9-12 and 18-20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Lee '402 in view of applicant's admission.

The conflicting claims are not patentably distinct from each other because the methods of the patented claims fully embrace the method of the instant claims as detailed above in light of applicant's admission that the species of organic or inorganic gel, of metal oxides, and of metal alkoxides are not patentably distinct (see response filed 10 March 2006).

12. Claims 1 and 4-6 stand, and new claims 48-51 are, rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 5, 6, 10, 13, 14, 15, 18, 20 and 24 of US Patent 6,729,042 (Lee '042 hereinafter).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the patent claims methods of decreasing the time to exchange

Art Unit: 1712

fluids and increasing the transport of fluids—including compressible and supercritical fluids—within a porous media—including aerogels—comprising applying a plurality of pressure pulses of at least two different frequencies—including those between about 0.001 Hz to about 100 MHz—and different amplitudes—including those between about 0.01 psi to about 1,000 psi—to the fluids. Further, the disclosure defines the form of the aerogel to be to be 'beads', 'monoliths' and 'composites' as defined in the instant specification (Column 4 Lines 49-64). See *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

13. Claims 9-12 and 18-20 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of Lee '042 in view of applicant's admission.

The conflicting claims are not patentably distinct from each other because the methods of the patented claims fully embrace the method of the instant claims as detailed above in light of applicant's admission that the species of organic or inorganic gel, of metal oxides, and of metal alkoxides are not patentably distinct (see response filed 10 March 2006).

14. Claims 1 and 4-6 stand, and new claims 48-51 are, provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 10, 13, 15, 17, 18 and 24 of copending Application No. 10/665,181.



Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending application claims a method of increasing the transport of fluids—including compressible and supercritical fluids—within a porous media—including aerogels—comprising applying pressure pulses—including those between about 0.001 Hz to about 100 MHz—to the fluids. Further, the disclosure defines the form of the aerogel to be to be 'beads', 'monoliths' and 'composites' as defined in the instant specification (Page 6 Line 35 – Page 7 Line 14). See *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

15. Claims 9-12 and 18-20 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 10, 13, 15, 17, 18 and 24 of copending Application No. 10/665,181 in view of applicant's admission.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of the copending claims as detailed above fully embrace the method of the instant claims in light of applicant's admission that the species of organic or inorganic gel, of metal oxides, and of metal alkoxides are not patentably distinct (see response filed 10 March 2006).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 102***

16. Claims 14-16, 42, 48, 49 and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Kosmin.

Kosmin teaches a method of replacing the solvent above its critical point from a gel—including silica gels—with atmospheric air (evaporating) comprising applying vibratory agitation—which would result in a pressure pulsation—at greater than 1000 cycles per minute, preferably 1000 to 3600 cycles per minute—which calculates to  $16\frac{2}{3}$  Hz, preferably  $16\frac{2}{3}$  to 60 Hz (Column 1 Lines 9-60) wherein the reaction product comprises lumps of about one-half inch in diameter—which reads on the limitation of ‘beads’ as defined by the instant specification as aerogel bodies of generally spherical shape having a diameter, that is typically in the range of tenths of millimeters to about a centimeter. (Example 1, Column 3 Lines 52-57).

***Claim Rejections - 35 USC § 103***

17. Claims 1, 4, 9-12, 17-21, 24, 29-31, 36 and 50 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of Kosmin and applicant’s admission.

Cheng discloses a method of making aerogels produced by hydrolyzing an inorganic alkoxide—including tetraethyl silicates—with a metal—including silicon—removing the solvent using various fluids, including supercritical carbon dioxide and completing the extraction by drying at about 80°C to 100°C, which would also drive-off

Art Unit: 1712

the supercritical CO<sub>2</sub> (Column 1 Lines 6-11, Column 2 Lines 50-53, Column 5 Lines 22-44 and Column 6 Lines 7-12).

Cheng does not disclose expressly applying pulses to the system.

Kosmin teaches a method of replacing the solvent above its critical point from a gel—including silica gels—with atmospheric air (evaporating) comprising applying vibratory agitation—which would result in a pressure pulsation—at greater than 1000 cycles per minute, preferably 1000 to 3600 cycles per minute—which calculates to 16-2/3 Hz, preferably 16-2/3 to 60 Hz wherein the reaction product comprises lumps of about one-half inch in diameter—beads as detailed above.

Kosmin does not disclose expressly the species of the species of organic gels, metal oxides other than silicon, and the metal alkoxides as claimed; however, applicant has admitted, in the response filed on 10 March 2006, that the species of organic or inorganic gel, of metal oxides, and of metal alkoxides are not patentably distinct (see response filed 10 March 2006).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include the application of vibratory agitation of Kosmin in the process of Cheng. The motivation to do so would have been to increase the production of aerogel through the application of shear (Kosmin Column 2 Lines 25-38).

Regarding claim 4, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to pulse the agitation at the frequency and amplitude claimed for the purpose of driving-off all of the solvent, since it has been held that that

Art Unit: 1712

discovering an optimum value of a result effective variable involves only ordinary skill in the art. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA).

Regarding claims 21 and 36, although the above rejection is not directed to the elected pulse generation means, the rejection is offered in the interest of compact prosecution.

18. Claims 5-7, 21, 28 and 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of Kosmin and applicant's admission as applied to claims 1, 4, 9-12, 17-21, 24, 29-31, 36 and 50 described above in further view of US Patent 5,295,509 (Suto hereinafter).

Cheng and Kosmin combine to teach a method of making aerogels produced by hydrolyzing an inorganic alkoxide—including tetraethyl silicates—with a metal—including silicon—removing the solvent using various fluids, including supercritical carbon dioxide and completing the extraction by drying at about 80°C to 100°C, which would also drive-off the supercritical CO<sub>2</sub> while applying vibratory agitation as described above.

Cheng and Kosmin do not disclose expressly piezoelectric pulse generation means.

Suto discloses a pulse nozzle wherein two piezoelectric crystal elements drive a member to repeatedly open and close a flow of gas in a pulse manner at frequencies greater than 10 Hz (Abstract, Column 1 Lines 6-25).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to generate the vibratory pulses in the combined method of Cheng and

Kosmin utilizing the pulse nozzle of Suto. The motivation to do so would have been to improve the capacity of the apparatus at a low temperature (Suto Column 1 Lines 6-10).

Regarding claims 5-7, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to pulse the agitation at the frequency and amplitude claimed for the purpose of driving-off all of the solvent, since it has been held that that discovering an optimum value of a result effective variable involves only ordinary skill in the art. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA).

### ***Conclusion***

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Kugel whose telephone number is (571) 272-1460. The examiner can normally be reached 6:00 AM – 4:30 PM Monday - Thursday.

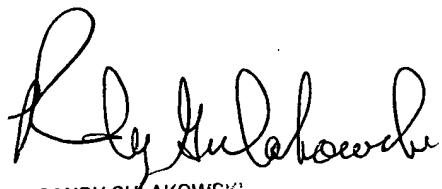
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 1712

you have questions on access to the Private PAIR system, contact the Electronic  
Business Center (EBC) at 866-217-9197 (toll-free).

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Art Unit 1712



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